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ABSTRACT

In a communication device at a transmitting side, a by-channel pilot generator generates pilot signals by channels which are spread with a code orthogonal between channels. A common pilot generator generates a pilot signal common to multiple channels. Adders allocate user data, the common pilot signal, and the pilot signals by channels according to a prescribed frame format, thereby generating transmission signals by channels. In a communication device at a receiving side, a time synchronizing unit and a frequency synchronizing unit establish a timing synchronization and a frequency synchronization using the common pilot signal. A by-channel pilot extractor extracts the pilot signals by channels from a reception signal, after the timing synchronization is established.